

ABSTRACT OF THE DISCLOSURE

A variable sample rate recursive digital filter is an adaptive digital filter where its coefficients are recalculated for each sample rate being processed in such a way as to maintain a constant frequency rate for all sample rates.

An equivalent resampling is done by taking the ratio of the bilinear transforms at the respective sample rates. From an initial or calibrated sample rate and a corresponding initial filter coefficient, a new filter coefficient for a new sample rate is obtained by multiplying the initial filter coefficient by a constant or coefficient factor that is a function of the initial filter coefficient and a ratio of the initial and new sample rates:

$$zFactor(z,R) := (1/z)\{(z(1+R) + (1-R))/(z(1-R) + (1+R))\}$$

The resulting new filter coefficient provides the adaptive digital filter with a constant frequency response when compared to the initial sample rate frequency response.